

Pattern of Impacted Mandibular Third Molar in Patients Presenting to Tertiary Care Hospital in Chitwan, Nepal

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ABSTRACT

Introduction: Impacted third molars are a major cause of visit to the oral surgeon and are associated with various complications like pain, inflammation of associated soft tissue and trismus leading to a need for their surgical removal. They are widely classified on the basis of angulation, depth and position as evident from orthopantomogram however they present in a diverse panorama of patterns each presenting different level of difficulty and different techniques for their removal. Our study describes different pattern of impacted lower third molars and perform brief literature review of dental and skeletal implications of impacted third molars.

Materials & Method: A retrospective study was designed in which 401 orthopantomogram were examined and the sex of patient, side of impaction and winters angulation based classification, depth and position classification as given by Pell and Gregory were recorded. Descriptive data analysis was performed with SPSS version 24 software.

Result: Out of total number of impactions 191 (47.6%) were in females and 210 (52.4%) were in males. Right sided impaction was seen in 199 (49.6%) cases and 202 (50.4%) were seen on left side. Mesioangular impaction was most common 203 (50.6%) followed by distoangular 97 (24.2%), horizontal 51 (12.7%) and vertical 17 (4.2%). Most common depth level of impaction was level I with 203 (50.6%) followed by level II 178 (44.4%) and level III 20 (5%). Most common position was position B 355 (88.5%) followed by position A 43 (10.7%) and position C 3 (0.7%). The most common pattern was IB (n=170) and IIB (n=166).

Conclusion: The most common impaction is mesioangular followed by distoangular and horizontal. Most of the impacted third molars are in moderately difficult position.

Keywords: Classification, Impacted mandibular third molar, Orthodontic implications.

INTRODUCTION

Impaction of tooth presents a clinical scenario where the tooth does not reach its intended final position in oral cavity and is not expected to do so after end of eruption age.¹ There is a growing tendency of third molars to not erupt and become impacted in today's world. There are many theories regarding etiopathogenesis which suggest genetic cause, decreasing functional load on the jaw and lack of space in a mandible that is decreasing in size due to diminished stimulus from processed and soft diet.² Of all third molars, mandibular third molars are the most commonly impacted and seen in clinics by an oral surgeon. The reason being their dependent position as compared to maxillary third molar leading to food accumulation in surrounding gingival flap and consequential pericoronitis.³ These impacted teeth present a diverse panorama of presentation radiographically. They have been classified by winters et al according to the angulation made by the long axis of third molar to the second molar and are mesioangular, vertical, horizontal, distoangular and

others.⁴ Pell and Gregory classified them according to the relative depth of third molar to the second molar and also according to the space available for the third molar crown to erupt distal to the second molar. These three classification types can occur in a diverse combination of angulation, depth and space available.⁵ Various skeletal and dental features are associated with higher incidence of mandibular third molar impactions.⁶ Impacted mandibular third molars have also been implicated in late crowding of anterior mandibular teeth and relapse of orthodontic correction of mandibular crowding.⁷ In this study we have provided a descriptive cross sectional data on pattern of impacted mandibular third molars as related to sex and side of impaction with angulation, depth, space available.

MATERIALS AND METHOD

Total 401 Orthopantomogram were included in the study. Sex of the patient and side of impaction were obtained from OPG record. Orthopantomogram was

performed for each case on a Gendex panoramic x-ray system. All impactions were classified according to Winters angulations classification as calculated from Orthopantomogram by tracing the long axis of third molar and the second molar and angle between them was calculated by the Orthoralix Vixwin software.⁸

Classification	Angle in degrees
Mesioangular	11 to 79
Vertical	-10 to 10
Horizontal	80 to 100
Distoangular	-11 to -79

Pell and Gregory Depth classification was done by tracing the occlusal level of third molar against the long axis of second molar on same software. Pell and Gregory space availability were calculated by measuring space available distal to second molar and anterior to anterior border of ramus and mesiodistal width of third molar after which the difference was calculated by the software. positive difference value was categorized as Class I, 0 value as Class II and negative value as Class III.⁶

Pell and Gregory depth classification

Classification	Depth position
Level A	Highest point of third molar at the same level as occlusal level of second molar
Level B	Highest point of third molar below the occlusal level but above cervical line of second molar
Level C	Highest point of third molar below the cervical line of second molar

Pell and Gregory Space availability classification

Classification	Space available
Class I	space between distal surface of second molar and anterior ramus is more than mesiodistal width of the third molar and the third molar is present completely anterior to the ramal bone
Class II	space between distal surface of second molar and anterior ramus is less than mesiodistal width of the third molar thereby the third molar is partially embedded in the ramal bone
Class III	space between distal surface of second molar and anterior ramus and the third molar is completely embedded in ramal bone

RESULT

Results were calculated with SPSS version 24 for mac (IBM corp. SPSS statistics). Descriptive studies were used to observe distribution of pattern of impaction and difficulty index with sex and side of impaction. total number of impactions 191(47.6%) were in females and 210(52.4%) were in males (Table 1). Right sided impaction was seen in 199(49.6%) cases and 202(50.4%) were seen on left side. (Table 2)

Mesioangular impaction was most common 203(50.6%) followed by distoangular 97(24.2%), horizontal 51(12.7%) and vertical 17(4.2%) (Table 3). Most common depth level of impaction was level I with 203(50.6%) followed by level II 178(44.4%) and level III 20(5%). Most common position

Table 1: Sex distribution of impacted mandibular third molars

Gender	Frequency	Percent
Female	191	47.6
Male	210	52.4
Total	401	100.0

Table 2: Side distribution of impacted mandibular third molars

Side	Frequency	Percent
Right	199	49.6
Left	202	50.4
Total	401	100.0

Table 3: Angulation distribution of impacted mandibular third molars

Winters classification	Frequency	Percent
Mesioangular	236	58.9
Vertical	17	4.2
Horizontal	51	12.7
Distoangular	97	24.2
Total	401	100.0

Table 4: Depth distribution of impacted mandibular third molars

Depth	Position		
	A	B	C
	Count	Count	Count
Level I	31	170	2
level II	12	166	0
level III	0	19	1

Table 5: Difficulty Index distribution of impacted mandibular third molars

	Frequency	Percent
Mild Difficulty	107	26.7
Moderate difficulty	266	66.3
Very difficult	28	7.0
Total	401	100.0

Table 6: Association between gender and angulation of Impaction

Gender	winters			
	mesioangular	Vertical	horizontal	distoangular
	Count	Count	Count	Count
Female	106	2	32	51
Male	130	15	19	46

Table 7: Distribution of position and depth of impaction with gender

Gender	Position								
	A			B			C		
	depth								
	Level I	level II	level III	Level I	level II	level III	Level I	level II	level III
	Count	Count	Count	Count	Count	Count	Count	Count	Count
Female	11	9	0	87	79	4	1	0	0
Male	20	3	0	83	87	15	1	0	1

was position B 355(88.5%) followed by position A 43(10.7%) and position C 3(0.7%). The most common pattern was IB (n=170) and IIB (n=166) (Table 4). On Pederson's difficulty index 66.3% presented as moderately difficult, 26.7% as mildly difficult and 7% as very difficult. (Table 5)

Mesioangular impactions were most common among male and female (Table 6). Pell and Gregory pattern IB and II B was found to be most common in both male and females (Table 7). Most impactions fell into the moderate difficulty level among males and females as well as sides. Both left and right side had similar difficulty index and no significant difference was found among gender and sides.

DISCUSSION

The study is first descriptive study to be conducted on types of Impacted mandibular third molar in Chitwan district. Our results show a slight predilection of male gender and left side. Similar studies have contrary results that show more female prevalence in a study done in Dhulikhel.¹⁰ Venta, et al. and Qirreish reported that there were more females

than males who presented with impacted mandibular third molars.^{11, 12}

Mesioangular angulation was the most common classification in our study which is similar to the findings from two previous studies in Nepal. Similar findings have been reported in most of the studies and the rotation from a horizontal to a vertical position during development of third molar has been attributed to the mesioangular angulation being most common form of impacted mandibular third molars.¹³⁻¹⁶

Most common form of ramus relationship in our study was position B and the most common depth was level I. Similar findings have been reported by other studies.

Evaluation of Pederson difficulty Index in our study shows that most common difficulty level is Moderate followed by mildly difficult. Many clinical trials and a systematic review have questioned the predictive value of Pederson difficulty index in real clinical scenarios but it is still a valuable tool for initial evaluation of impacted third molars.¹⁷

In our study, the most common pattern of depth and ramus space was seen as IB and IIB. No significant difference was seen among gender and sides. Difficulty was also statistically similar among gender and sides.

There are many skeletal and dental features associated with higher incidence of impacted mandibular third molars. Less than ideal posterior space for eruption, less resorption at anterior border of ramus and general posteriorly directed force of eruption of dentition are implicated for impaction of tooth. Less mandibular horizontal growth, vertically directed condylar growth and vertical growth pattern of mandible are associated with higher incidence of impactions.^{18,19}

There has been a long discussed controversy regarding the role of impacted mandibular third molars on delayed anterior dental crowding and relapse of orthodontic treatment. Some authors implicated the anterior directed force and resulting mesial drift of the dentition was caused by pressure from an impacted mandibular third molar continuously exerting an anteriorly directed force.²⁰ This theory was analyzed with longitudinal studies which failed to show any significant difference in development of malocclusion and presence of impacted mandibular third molars.^{21,22} Furthermore, studies have proved that the anteriorly directed force on dentition is present even in absence of impacted third molars and is supposed to be the effect of occlusal inclination and masticatory forces during function. Multiple current systematic reviews have concluded that there is no conclusive evidence to associate impacted mandibular third molars with anterior dental crowding and relapse of orthodontic treatment and hence prophylactic surgical removal is not advocated.^{23,24}

One other issue regarding impacted third molars is their possible role as substitute for a non-salvageable second or first molars. In extraction cases for space management during orthodontic treatment, there is strong evidence suggesting that favorable eruption and alignment of

third molars are seen in these cases.²⁵ Thus, it has been suggested that in cases where premolars have been extracted for orthodontic treatment, seemingly impacted mandibular third molars should be treated conservatively as they more than often end up in good position and alignment and might act as substitutes in cases where first or second molars are not salvageable.²⁶⁻²⁸

Another issue is when there is planned orthodontic movement of molars distally to gain space. The Impacted third molars tend to act as center of resistance and significantly slow down the posterior movement of tooth sometimes even necessitating the use of extraoral implant based anchorage and force. It is imperative to say that in such cases frequent removal of impacted third molar will allow desired and predictable movement in less amount of time and thus should be consideration during treatment planning between the orthodontist and the oral surgeon.^{29,30}

CONCLUSION

Our study presents descriptive data on pattern of mandibular impacted third molars based on OPG radiograph and the results are similar to other studies performed in Nepal as well as other countries. Prophylactic removal of impacted third molars have no sound backing evidence and there are no evidence implicating them in anterior dental crowding and relapse of orthodontic treatment. On the contrary, they can act as substitutes for molars and tend to erupt in good alignment and position in extraction cases, hence should be preserved.

Limitations

This study sample was taken from a single tertiary care hospital unit and a small sample size limits the inferential capacity of the study. A multicenter study with large sample size should be planned in the future.

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